CLAIMS:

1. A method of dynamically controlling the traction of wheels on a first axle on a locomotive in ~~at~~ a train having one or more locomotives each having propulsion axles and wheels moving over a set of rails to reduce response time and increase locomotive traction, the method comprising:

measuring the adhesion quality of the first axle;

measuring the adhesion quality of at least one other axle of the train constituting a second axle; and,

using data indicative of the adhesion quality of the second axle to produce a signal to advise a controller driving the first axle to maximize the tractive effort of the first axle if the tractive effort of the second axle is operating closer to a maximum for its current rail conditions so to reduce the amount of time for the first axle to attain its maximum tractive effort for its rail conditions.

2. The method of claim 1 wherein the first axle is positioned forward of the second axle in the direction of travel of the train.

3. The method of claim 1 in which said measuring the adhesion quality of the first axle on the locomotive and the second axle includes measuring one of the tractive effort, ~~or~~ torque~~,~~ ~~or~~ and creep of the axles.

4. The method of claim 1 in which the signal is a coupled creep control signal that is combined with other adhesion quality information to produce a creep control signal used to drive the first axle.

5. The method of claim 4 in which the coupled creep control signal is a function of the proximity of the first axle on the locomotive to the other axle.

6. The method of claim 1 in which the locomotive has a plurality of trucks on each of which axles are mounted, and the method includes combining values representative of the adhesion operation of all the axles mounted on one of the trucks to produce a signal supplied to controllers driving each of the axles on that truck to maximize the tractive effort of all the axles mounted on the truck in the least amount of time in response to changed rail conditions.

7. The method of claim 6 further including combining values representative of the adhesion quality of all of the axles mounted on all of the locomotive's trucks to maximize the tractive effort of all of the locomotive's axles in the least amount of time in response to said changed rail conditions.

8. The method of claim 7 further including combining adhesion quality information for each of the axles to produce a matrix of coupled creep control values, a coupled creep control signal supplied for each axle being derived from the matrix of coupled creep control values for all of the axles.

9. The method of claim 1 wherein the locomotive is one of a plurality of locomotives in a consist and the method further includes using the values representative of the adhesion quality of an axle mounted on one of the other locomotives to maximize the tractive effort of the axle mounted on the one other locomotive in the least amount of time in response to changed rail conditions.

10. The method of claim 9 in which the values representative of the adhesion quality of all of the axles mounted on the lead locomotive in the consist are used to maximize the tractive effort of the axles mounted on each trailing locomotive in the consist in the least amount of time in response to said changed rail conditions.

11. The method of claim 10 in which there are a plurality of consists traveling over the same set of rails and the method further includes using values representative of the adhesion quality of an axle mounted on a locomotive in the leading consist to maximize the tractive effort of the axle mounted on the ~~one~~ locomotive in the leading consist in the least amount of time in response to changed rail conditions.

12. The method of claim 1 in which the method further includes using historic data about the respective axle to produce the signal.

13. The method of claim 1 further including using location specific information about the set of rails over which the locomotive is traveling to produce the signal.

14. The method of claim 13 further including using time specific information about the set of rails over which the locomotive is traveling to produce the signal.

15. In a railroad train having one or more locomotives, each having a plurality of axles on each of which are mounted wheels for moving the train over a set of rails and a traction motor controller for driving each respective axle to move the locomotive over the rails, the improvement comprising:

a control system for dynamically controlling traction associated with the axles of the one or more locomotives and including a coupled creep control unit to which is supplied adhesion quality information for an axle, and adhesion quality information for at least one other axle, the system producing a signal based upon the adhesion quality information of said one other axle to advise ~~advising~~ a controller driving the axle to maximize the tractive effort of the axle if the other axle is operating closer to a maximum for its rail

conditions so to reduce the amount of time for the axle to attain its maximum tractive effort.

16. The improvement of claim 15 wherein the axle is located forward of the other axle in the direction of travel of the train.

17. The improvement of claim 15 in which the coupled creep control unit utilizes adhesion quality information for the axle on the locomotive and the other axle which includes at least one of the tractive effort, ~~or~~ torque~~, or~~ and creep of the respective axles.

18. The improvement of claim 17 in which the coupled creep control unit produces a signal that is a function of the proximity of two axles to each other.

19. The improvement of claim 15 in which the locomotive has a plurality of trucks on each of which a plurality of axles are mounted, and the control system combines values representative of the adhesion quality of all of the axles mounted on one of the trucks to produce a signal supplied to controllers driving each of the axles on that truck to maximize the tractive effort of the axles mounted on the truck.

20. The improvement of claim 19 wherein the control system combines values representative of the adhesion quality of all of the axles mounted on all of the locomotives' ~~locomotive's~~ trucks to maximize the tractive effort of all of the locomotives' ~~locomotive's~~ axles.

21. The improvement of claim 20 wherein the control system further combines adhesion quality information for each of the axles to produce a matrix of coupled creep control values, a coupled creep control signal supplied for each axle being derived from the matrix of coupled creep control values for all of the axles.

22. The improvement of claim 15 wherein the locomotive is one of a plurality of locomotives in a consist and the control system combines values representative of the adhesion quality of an axle mounted on one of the other locomotives to maximize the tractive effort of the axle mounted on said one other ~~the one~~ locomotive.

23. The improvement of claim 22 in which the control system combines values representative of the adhesion quality of all of the axles mounted on the lead locomotive in the consist to maximize the tractive effort of the axles mounted on each of the trailing locomotives in the consist.

24. The improvement of claim 22 in which there are a plurality of consists traveling over the same set of rails and the control system combines values representative of the adhesion quality of an axle mounted on a locomotive in the leading consist to maximize the tractive effort of the axle mounted on the one locomotive in the leading consist

25. The improvement of claim 15 in which the control system uses historic data about the respective axle to produce the signal.

26. The improvement of claim 25 wherein the control system further uses location specific information about the set of rails over which a ~~the~~ locomotive in a leading consist is traveling to produce the signal.

27. The improvement of claim 26 wherein the control system uses time specific information about the set of rails over which the locomotive in the leading consist is traveling to produce the signal.

28. A method of dynamically controlling the traction of an axle on a locomotive moving over a set of rails to reduce response time and increase~~s~~ locomotive traction, the method comprising:

measuring the adhesion quality of ~~a~~ an axle for its rail conditions;

accessing historic information regarding the adhesion quality of the other axles under corresponding rail conditions; and,

using data indicative of the measured adhesion quality of the axle and the historic information of adhesion quality for the other axles to produce an advisory signal for a controller driving the axle to maximize the tractive effort of the axle and reduce the amount of time for the axle to attain its maximum tractive effort.

29. In a railroad train having one or more locomotives, each having a plurality of axles on each of which are mounted wheels for moving the train over a set of rails and a traction motor controller for driving each respective axle to move the locomotive over the rails, the improvement comprising:

a control system for dynamically controlling traction associated with the axles of the locomotives and including a coupled creep control unit to which is supplied adhesion quality information for an axle and historic information regarding the adhesion quality of the other axles under corresponding rail conditions, the control system using data indicative of the measured adhesion quality of the axle and the historic information of adhesion quality for the other axles to produce an advisory signal for the controller driving the axle to maximize the tractive effort of the axle and reduce the amount of time for the axle to attain its maximum tractive effort.